



# Character Education Science FCAT Warm-Up



## Respect

High School - January, 2008

**Respect** is defined as showing consideration, understanding, and regard for people, places and things. Relating to the environment, we should all show respect to the health and well being of our planet. Be sure to show respect to animals, plants, and the environment by showing consideration, understanding, and high regard to all that share the planet with us.

### Activity 1: Definition Expedition

Sunshine State Standards, Grades 9-10: LA.910.2.2.4, LA.910.2.2.5, LA.910.6.3.3

Sunshine State Standards, Grades 11-12: LA.1112.2.2.4, LA.1112.2.2.5, LA.1112.6.3.3

The number of scientific words found in reports, journals, articles, and in the media seem to be endless and daunting at times. In this activity, students will learn how to define a term in technical writing, search the internet for scientific writings, then copy and paste sections into a Word document.

### Lesson Plan

Improve students' reading comprehension skills with this cross-disciplinary lesson. Begin the lesson by discussing what the word "definition" means and where definitions can be found. Share that, in addition to a dictionary or glossary, definitions often can be located within the body of the text itself. Explain to students that when they're learning a new concept in science or other fields, they need to know how to identify definitions as they read an article or textbook.

Read or write on the board the following paragraph to the students and explain that a definition is found in the text and ask them to find it.

*For a few minutes during a total solar eclipse, when the disk of the moon slides precisely between our planet and the sun, we'll glimpse a sight seldom seen: the sun's hot, churning atmosphere, called the corona. Unless light from the sun is blocked, the corona is usually too dim for us to see from earth. During an eclipse, we'll have a better view of the lower corona than even space telescopes can provide.* Taken from "The Sun-Earth Connection" by Mary Miller

Students should say that corona is defined as "the sun's hot, churning atmosphere." Ask them how they know that's a definition. They should respond that the phrase "called the" helped students recognize that a definition went before and a term went after that phrase.

Ask students to repeat the same steps with three other works of scientific writing, such as newspaper and magazine articles or reports found on the internet. Subjects should include climate change, water quality, invasive species, or any other environmental issue. Then have students complete the following steps with each article:

- Locate a definition within the scientific writing. If a definition is not provided within the article itself, have the students find it by using a dictionary.
- Select the paragraph containing the word and definition, and then click Edit> Copy.
- Paste the paragraph into a Word document.
- Highlight the definition phrase (include the term and the definition) with a color of your choice. The highlighter tool has an "abc" on it and is near the font color tool. Click View> Toolbars> Formatting if you don't see the toolbar.

Ask the students to repeat the above steps as they research a total of three articles. When the students are finished, ask for volunteers to share a few examples with the class. As they're sharing, ask the students to identify what in the sentence structure itself indicated a definition. Write the words and definitions on the class board for all students to see.

As an additional step, utilizing Sunshine State Standards: LA.910.4.2.3 & LA.1112.4.2.3, have each student choose five of the given definitions and form them into new sentences. Or perhaps have the students write their own science articles using a few of the technical words.

**Activity 2: Carbon Dioxide Sources and Sinks**

Carbon dioxide (CO<sub>2</sub>) provides the bubbles in your soda. CO<sub>2</sub> is also a greenhouse gas, which helps in maintaining the earth's average temperature of about 15°C (59°F). The CO<sub>2</sub> traps infrared energy emitted from the earth's surface and warms the atmosphere. In this activity, you will discover some of the ways CO<sub>2</sub> gets into and out of the atmosphere.

**Materials:** six test tubes, a rack, one hole stopper with tubing attached, baking soda, vinegar, aluminum foil, cotton balls, straws, a bottle of bromothymol blue (BTB) indicator solution, a sprig of Elodea (water plant), masking tape, and marker.

*Part 1: Detecting CO<sub>2</sub> gas*Source: <http://eo.ucar.edu>

1. Use a small piece of masking tape to label two of the test tubes A and B (a third will be unlabeled). Fill tubes A and B approximately 1/3 full of BTB. (Tube A will be the control, tube B will be the treatment.) Place the tubes in a rack.
2. Fill an unlabeled tube approximately 1/4 full of vinegar.
3. Using the foil, make a small "boat" that will fit easily into the test tube and float on the vinegar. Fill the boat about half-full of baking soda. Carefully slide the foil boat inside the unlabeled vinegar-filled test tube. Plug the test tube with the stopper and tubing.
4. Place the free end of the tubing into tube B. Make sure the end of the tubing reaches the bottom. Place a cotton ball into the neck of tube B.
5. Mix the vinegar and baking soda together by GENTLY swirling the tube from side-to-side. Don't shake it upside-down! Gas bubbles will begin to rapidly evolve from the mixture into tube B with the BTB.
6. After a minute or so, compare the color of tubes A and B. What happened?

*Part 2: Are animals and plants sources or a sinks of CO<sub>2</sub>?*

1. Fill test tube C approximately 1/3 full of BTB.
2. Place a straw in the test tube and place a cotton ball in the test tube opening. Gently blow on the straw. Note the color change. What happened?
3. Fill test tube D approximately 1/3 full of BTB.
4. Place a sprig of Elodea at the bottom of the tube. Wrap the tube entirely in foil and leave it in the rack for 24-hours.
5. Unwrap the foil and note the color change. What happened?
6. Using the unwrapped test tube with Elodea from Part 3, leave in the light and observe the BTB color change.

*Part 3: Are fossil fuels a source of CO<sub>2</sub>?* (Recommended as a teacher demonstration. For detailed information on this portion of the activity, refer to: [http://eo.ucar.edu/educators/ClimateDiscovery/ESS\\_lesson1\\_10.19.05.pdf](http://eo.ucar.edu/educators/ClimateDiscovery/ESS_lesson1_10.19.05.pdf)).

1. Fill test tube E approximately 1/3 full of BTB.
2. Place a straw in the test tube and place a cotton ball in the test tube opening. Insert straw into a vehicle exhaust filled balloon and allow some of the emissions into the test tube. What happened?

*Extension:* Ask students to research sources and sinks of CO<sub>2</sub> and write an essay about the information they learned.

**Activity 3: Quenching the Thirst of Florida's Yards**

Sunshine State Standard SC.G. 2.4.5

Throughout Florida, yards and landscaping make our communities beautiful. However, there's a price to pay in terms of environmental impact of more than three million lawns and yards in Florida. The typical Florida household consumes hundreds of gallons of water each day, and a substantial portion of all water consumed is used to irrigate lawns and for landscaping. However, there are ways to have lawns and beautiful landscaping without negatively impacting the environment. The use of native, drought-tolerant plants is known as xeriscaping. Using plants that require less water to live and little or no fertilizers is better for the environment. There is a movement in Florida to encourage residents to landscape with native plants and reduce the size of their lawns in order to conserve water and minimize the use of fertilizers and pesticides.

**Objective:** Students will examine and calculate the current water use for irrigation of school grounds and propose changes that will result in reduced water consumption for irrigation. This activity can be done on an individual basis or as a class.

- Establishing a Benchmark*—Print out the yardstick checklist on the Florida Yards and Neighborhoods website (<http://hort.ufl.edu/fyn/>) and use it to evaluate the current "height" or quality of the school grounds. Use this as your reference point or benchmark.
- Calculate the water consumption*—Have students map the area on their school grounds (or portion of their school grounds) that are currently irrigated. Students should use existing maps of school grounds and draw polygons or circles around areas that receive irrigation. Based on these observations, students should calculate the area that is currently irrigated. Have students develop and use water collecting devices to determine the amount of water discharged per minute by irrigation devices (Obtain a copy of *What You Need to Know about Fertilizing and Watering* from the Southwest Water Management District or the Broward County Water Resources Division at [www.broward.org/waterresources](http://www.broward.org/waterresources)
- Students should establish total water use, assessing whether water use is appropriate or excessive and then make recommendations to the grounds keepers and school administration.

Source: [www.floridasprings.org](http://www.floridasprings.org)